" 'The origin of these craters has been the subject of many theories. Despite their marked peculiarities of form, they have more commonly been ascribed to volcanic action; but they have also been referred to the bursting of gigantic bubbles, to the evaporation of water and its accumulation about the point of evaporation, as ice, and to the impact of bodies from without. Personally, I favor the last mentioned explanation, but I differ from other writers in respect to the origin of the colliding bodies. It has been previously surmised that these might be rocks hurled from terrestrial volcanoes; that they might be meteors from the recesses of space, such as are continually burned in the upper layers of our atmosphere, giving rise to shooting stars, and that they might be aggregates of such meteors constituting balls of cosmic dust. Now, my idea of their origin is based upon the phenomena of the planet *Saturn* and its ring. About that planet is a disc-like ring which astronomers believe to be constituted of an indefinitely large number of very small bodies revolving about the planet in parallel orbits — a symmetrically shaped form of small satellites. Assume that a similar ring of minute satellites once encircled the Earth, and that those gradually became aggregated into a smaller number of larger satellites, and eventually into a single satellite—the Moon. The craters mark the spots where the last of the small bodies collided with the surface when they finally lost their independence and joined the larger body.' "

Discovery of Asteroids by Photography.

The remarkably rapid advance made in many lines of astronomical research since the introduction of dry-plate photography is nowhere more marked than in the discovery of the asteroids. *Ceres*, the first of the small planets, was discovered the first day of this century, and a few years later three others were found. A fifth was not added until 1847; but since then they have been searched for systematically, with wonderful patience, by Peters, Watson, Palisa, and many other noted astronomers. One year ago the number had reached 322. No. 323 was discovered photographically by Dr. Wolf, of Heidelberg, and in the past year he has detected twelve other new planets on his plates. A single negative recorded four planets, two new ones and two previously discovered. Charlois, of Nice, discovered two by visual methods early this year; but later he adopted the photo-

graphic method, and has recently added three discoveries. In the past year PALISA has discovered two by the older methods. 342 are now known, and at the present rate of discovery the resources of the computing staff in Berlin will soon be severely taxed to furnish satisfactory orbits for them.

CHARLOIS has assigned to the first asteroid discovered by him in 1892 the name *Columbia*, in honor of our quadri-centennial year.

WOLF has named the first planet discovered by him *Brucia*, in honor of Miss BRUCE, who has made generous contributions of money for astronomical research. W. W. C.

ELEMENTS OF COMET *c*, 1892 (BARNARD, Oct. 12).

From Mr. BARNARD'S observations of October 13, 19 and 25, I have computed new parabolic elements of the comet discovered by him with the CROCKER photographic telescope. They are :

$$T = \text{Gr. M. T., 1892, Dec. } 2^{d}.5977$$
$$\left.\begin{aligned} \omega &= 165^{\circ}\ 44'.51 \\ \Omega &= 201\ \ 49\ .34 \\ i &= \ 33\ \ 35\ .93 \end{aligned}\right\} 1892.0$$
$$\log q = 0.18528$$

Residuals (Obs.—Comp.).

$$\cos\beta'.\,\Delta\lambda' = +0'.64$$
$$\Delta\beta' = \ \ 0.00$$

The residual in longitude is large, but another approximation to a parabolic orbit does not reduce it. This fact, taken in connection with the direct motion and the fairly small inclination, points strongly to an elliptic orbit. However, the first observation depends only upon a *Lalande* star place, and the character of the orbit cannot now be decided.

The original elements, distributed by telegraph, represented the observations upon which they were based very well; though, as stated in the telegrams, they were subject to considerable uncertainty. W. W. C.

October 27.

NOTE.—Elliptic elements by Professor KRUEGER, of Kiel, Germany, just received, assign to this comet a period of 10 years. Elements by SCHUELHOF assign a period of about 6 years, and indicate a close relation to WOLF'S periodic comet.